NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

F A C T S H E E T
(Pursuant to NAC 445A.236)
August 2004

PERMITTEE NAME: Carson City Municipal Golf Corporation

PERMIT NUMBER: NEV92021

DISCHARGE LOCATION: Eagle Valley Golf Course
3999 Centennial Park Drive
Carson City, Nevada 89706

Latitude: 39°10'47" North
Longitude: 119°42'29" West

Township 15 South, Range 20 East, Sections 2 and 3

PUBLIC WATER SUPPLY: Within 1,000-feet of the well head protection zone for pumping wells owned and operated by the Carson City Water Department.

FLOW: 3.0 million gallons per day (MGD)

GENERAL:
The Carson City Municipal Golf Corporation uses treated effluent from the Carson City Utility Department Wastewater Reclamation Plant for spray and drip irrigation of lawn and landscaped areas at the Eagle Valley East and the Eagle Valley West Golf Courses. The first permit authorizing the use of reclaimed wastewater for irrigation of this site was issued in 1993.

Irrigation using treated effluent is conducted in accordance with an Effluent Management Plan (EMP) submitted to, and approved by, the Nevada Division of Environmental Protection Bureau of Water Pollution Control (BWPC). An approved EMP is on file at the BWPC.

DISCHARGE CHARACTERISTICS:
At a minimum, water used for irrigation is treated to meet secondary standards, nitrified, and chlorine disinfected. Data on file for the 4th quarter 2003 reports effluent characteristics as follows:

PARAMETER	AVERAGE VALUE	MAXIMUM VALUE
Fecal Coliform (CFU/100 mL)	1.3	3
Carbonaceous Biochemical Oxygen Demand (CBOD, mg/L)	7.1	8.3
Total Suspended Solids (TSS, mg/L)	4.6	5.8
Total Nitrogen (mg/L)	14.6	Not reported
Nitrate (mg/L)	7.98	Not reported

The average total nitrogen concentration for 2002, based on monthly averages, is reported in the renewal application to be 26 mg/L. The average and maximum flow rates discharged between 1999 and 2003 are 0.5 and 1.2 million gallons per day, respectively.

RECEIVING WATER CHARACTERISTICS:

Treated effluent used for irrigation discharges to groundwater, which is reportedly encountered at depths ranging from approximately 2 to 28 feet below grade surface. Groundwater gradient has been reported between 0.011 to 0.016 feet per foot with a flow direction toward the south and slightly southeast. Groundwater monitoring wells MW-6 and 18 are used to characterize groundwater upgradient and downgradient, respectively, on the West Course. Both monitoring wells appear to be located in irrigated areas of the course.

Monitoring wells 7, 8, and 12, in order from north to south, respectively, are used to characterize groundwater below the East Course. Monitoring well #8 is located centrally within the East Course, and MW-12 is located approximately 400 feet north of the southern property boundary, presumably downgradient of MW-8. All three (3) wells appear to be located within irrigated areas. Nitrate and depth to water data extracted from quarterly discharge monitoring reports and documents on file is as follows:

Well Location	Casing Depth (feet below grade surface)	Screen Interval (feet below grade surface)	Approximate Depth to Water[1] (feet below top of casing)	Nitrate Concentration (mg/L, 2002 through 2003)
MW-6	24.7	15-25	Dry	NA
MW-7	44.7	35-50	22-28	2.3-2.4
MW-8	34.25	32.5-35	10-13	15-16
MW-12	33.7	30-35	2-5	0.23-2.1
MW-18	51	NA	2-10	.05-.44

[1] 4th Quarter Annual Report 2003, data reported 1998 through 2003

NA: Not available; interval cannot be confirmed from documentation on file.

In February 1998, as a requirement prior to the 1998 permit renewal, four (4) wells were sampled to profile groundwater concentrations of nitrogen species, total dissolved solids, and chloride. A nitrate concentration of 13 mg/L was quantified in the sample collected at monitoring well location MW-8. Nitrate concentrations observed at the remaining monitoring well locations were at or below 2.4 mg/L.

Additional wells near MW-8, including MW-9, MW-14, and MW-15, were sampled in March 1998. Nitrate as nitrogen concentrations were quantified at 14 and 9.4 mg/L at well locations MW-9 and MW-14, respectively. MW-15 was dry.

The irrigation discharge is located within 1000-feet of the wellhead protection zone associated with several Carson City Water Department pumping wells. Because of the proximity of the discharge to the pumping wells, the Carson City Water Department will be provided specific notice of this proposed permit renewal.

PROPOSED LIMITATIONS:

Proposed limitations are designed to verify the constituent composition of effluent discharges and control application and operational parameters to preemptively protect groundwater conditions.

During the period beginning on the effective date of this permit and lasting until the permit expires, the Permittee is authorized to discharge treated wastewater effluent for irrigation of Eagle Valley Golf Course.

Samples and/or measurements taken in compliance with the monitoring requirements specified below shall be collected:

- At a flow meter accessible at the facility and available for routine measurement; and,
- After treatment and prior to distribution for reuse. Data may be obtained from the Carson City Utility Department Wastewater Reclamation Plant to satisfy compliance and reporting requirements confirming effluent quality.

The discharge shall be limited and monitored as specified below:

PARAMETERS	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS	
	30-Day Average	Daily Maximum	Annual Total	Measurement Frequency	Sample Type
Total Flow (mgd)	3.0	3.0	-----	Continuous	Flow Meter
Annual Application Volume (acre-feet/year)	-----	-----	1,055[1]	Monthly	Flow Meter or Totalizer
Fecal Coliform[2] (CFU/100 mL)	2.2	23	-----	Weekly	Discrete
Nitrate as N (mg/L)	Monitor & Report			Monthly	Discrete
Total Nitrogen as N (mg/L)	Monitor & Report			Monthly	Discrete
Total Nitrogen as N Applied (pounds)	Monitor & Report			Monthly	Calculation
Cumulative Annual Nitrogen Applied (pounds/acre-year)[3]	230[4]			Quarterly	Calculation (cumulative)

mgd: Million gallons per day
CFU/100 mL: Colony forming units per 100 milliliters
mg/L: Milligrams per liter
as N: As nitrogen

Footnotes:

[1]: Determined from Consumptive Use Balance (Effluent Management Plan, December 1998) and limited to 110% of the allowable hydraulic loading rate based on plant water use requirements.

[2]: Fecal coliform concentrations must be limited based on required buffer zones specified in NAC 445A.276. For zero-distance buffer zones, fecal coliform concentrations must be equal to or below the effluent reuse limitations prescribed.

[3]: Annual nitrogen load is determined based on the nitrogen budget. The total annual nitrogen applied (lbs/acre/year) shall not be greater than the total annual nitrogen uptake (lbs/acre/year). Calculations and monitoring data shall use the **total nitrogen** in the applied wastewater (monitored by the treatment facility), total nitrogen from fertilizer applications, nitrogen uptake by crops or vegetation, evapotranspiration rate, precipitation rate, and fraction of applied nitrogen removed by denitrification and volatilization.

Quarterly accounting of nitrogen load is required to track and verify timely management of nitrogen application throughout the progression of a calendar year. Each quarter, the cumulative annual amount of total nitrogen applied (January through December) shall be increased by the incremental amount of nitrogen applied during the reported quarter. Data provided in the fourth quarter annual report must demonstrate compliance with the annual nitrogen load allocated (January through December).

[4]: This value is obtained from the nitrogen budget worksheet, Year 2003 included in the Eagle Valley Golf Course 2003 Annual Report.

- The supplier of the effluent may perform required analytical monitoring; however, the Permittee must report the analytical results to verify compliance with effluent reuse limitations in accordance with quarterly reporting requirements.

Rationale:

Flow: Flow is limited by the volume of treated effluent requested and available from the Carson City Utility Department Wastewater Reclamation Plant.

Annual Application Volume: This parameter is required under the EMP. The annual application volume assigned is based on the calculated plant water use requirement (54 inches per year) provided in the EMP (on file, December 1998, Appendix D, resubmitted on May 23, 2001). The permitted value is 110% of the value

calculated.

Fecal Coliform: The concentration of fecal coliform in treated wastewater discharged for irrigation is restricted in accordance with NAC 445A.276 for a zero-distance buffer zone.

Nitrate: The nitrate concentration in applied effluent is a monitor and report requirement to track this fraction of the total nitrogen mass applied to the site for purposes of evaluating groundwater conditions. Should nitrate concentrations in groundwater begin to exhibit an increasing trend, further examination of nitrate concentrations in effluent and how application rates affect groundwater may be required.

Total Nitrogen: The concentration of total nitrogen in treated wastewater used for irrigation is required for purposes of determining mass discharge to irrigated landscape areas. The nitrogen concentration in treated wastewater is a component of the calculation for monthly nitrogen mass application, which is ultimately used to reconcile annual nitrogen budgets.

The total nitrogen as nitrogen (as N) application rate and the annual nitrogen load (balance) are required under the EMP. Quarterly reconciliation of the nitrogen load per acre is required so that facility operators can assess and optimize irrigation practices to effectively manage and routinely demonstrate projected compliance with the annual nitrogen load (balance) limitation. The annual nitrogen load is assigned based on the nitrogen uptake value submitted in the Eagle Valley Golf Course Nitrogen Budget Worksheet, Year 2003 included in the 2003 Annual Report (on file).

GROUNDWATER MONITORING REQUIREMENTS:

The existing permit, issued in 1998, was written to accommodate the elevated nitrate as N concentrations identified at monitoring well #8 and in the immediate vicinity by requiring a specific annual review of groundwater monitoring data collected at this well location. If an increasing trend is evident, then abatement measures are to be implemented to correct and remedy further degradation of groundwater.

As of 4th quarter 2003, groundwater concentrations of nitrate as N at MW-8 have remained stable throughout the 5-year permit term (14 to 16 mg/L). Therefore, this specific condition, which specifically addresses the conditions observed at monitoring well location MW-8, is maintained in the proposed renewal. The remaining monitoring wells used to profile groundwater at the facility are subject to threshold conditions progressively invoked as nitrate as N concentrations increase to 7, 9, and 10 mg/L.

Existing monitoring wells shall be sampled for the presence of nitrogen compounds, TDS, and chloride. Monitoring wells shall be measured and sampled according to the following parameters:

PARAMETERS	GROUNDWATER LIMITATIONS	SAMPLE LOCATIONS[1]	MONITORING REQUIREMENTS	
			Measurement Frequency[2]	Sample Type
Depth to Water (feet)	Monitor & Report	Each well	Quarterly	Discrete Measurement
Groundwater Elevation (amsl)	Monitor & Report	Each well	Quarterly	Discrete Measurement
Groundwater Gradient and Flow Direction (ft/ft, compass direction)	Report	-----	Quarterly	Calculate & Illustrate[3]
Total Nitrogen as N (mg/L)	Monitor & Report	Each well	Quarterly	Discrete

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PARAMETERS	GROUNDWATER LIMITATIONS	SAMPLE LOCATIONS[1]	MONITORING REQUIREMENTS	
			Measurement Frequency[2]	Sample Type
Nitrate as N (mg/L)	Monitor & Report	Each well	Quarterly	Discrete
Total Dissolved Solids (mg/L)	Monitor & Report	Each well	Quarterly	Discrete
Chloride (mg/L)	Monitor & Report	Each well	Quarterly	Discrete

ft: feet
amsl: above mean sea level
ft/ft: foot per foot (vertical to horizontal)
mg/L: milligram per liter
as N: as Nitrogen

Footnotes:

[1]: Monitoring wells currently include: MW-6, 7, 8, 12, and 18. All groundwater monitoring wells installed as a function of the permitted discharge shall be included in the monitoring program prescribed.

[2]: Sampling frequency may be modified or reduced, in whole or in part, at the discretion of the Division, upon demonstration of groundwater concentrations or conditions which warrant or justify alternative monitoring schedules.

[3]: Groundwater gradient and flow direction shall be calculated based on surveyed well locations and casing elevations. Well locations must be clearly labeled on a scaled map illustrating and denoting the groundwater gradient and flow direction.

- Wells shall be monitored in accordance with permit conditions and EMP requirements. Should site conditions and/or operational activities necessitate or warrant the installation of additional monitoring wells, all wells shall be incorporated into the required monitoring schedule. All subsequent monitoring wells proposed or required (designs and locations) shall be approved by the Division prior to installation and constructed in general accordance with "WTS-4: Monitoring Well Design Requirements" (NDEP, February 1997).

- At the time of permit issuance:

  - If the nitrate as nitrogen concentration in groundwater at a monitoring well location is below 7.0 mg/L, and subsequent concentrations measured increase to:

    A. 7.0 mg/L, the Permittee shall revise the EMP to provide management practices which increase the nitrogen uptake by vegetation and/or adjust other nitrogen sources such as fertilizer application rates.

    B. 9.0 mg/L, the Permittee shall execute all corrective action necessary to ensure no further degradation of groundwater. The Permittee shall conduct an engineering evaluation that reviews irrigation programs, lawn maintenance practices, hydrologic conditions, or any other pertinent factor or parameter to define and describe the cause or source of additional nitrate load to the shallow aquifer and shall propose short and long-term solutions to justify continued use of treated effluent for irrigation purposes.

    C. 10.0 mg/L, the Permittee shall discontinue the use of reclaimed wastewater and the discharge to groundwater shall cease, unless otherwise authorized by the Division.

  - If the nitrate as nitrogen concentration in groundwater at a monitoring well location is above 7.0 mg/L, each year the nitrate as nitrogen concentrations in groundwater shall be plotted against date for the most current five (5)-year period. The plot must include all four (4) quarters of the current year and be submitted with the 4th quarter Annual Report.

If an increasing nitrate as nitrogen trend is evident or suspect, the EMP shall be revised to provide management practices that increase nitrogen uptake by vegetation and/or adjust other nitrogen sources such as fertilizer application rates. The Permittee shall also take all corrective action necessary to ensure that there is no further degradation of groundwater.

SCHEDULE OF COMPLIANCE:

The Permittee shall implement and comply with the provisions of the permit upon issuance and the following schedule of compliance, including in said implementation and compliance, any additions or modifications the Administrator may make in approving the schedule of compliance.

- **Upon issuance of the permit,** the Permittee shall achieve compliance with all discharge limitations; and,
- **Within 45 days of the permit issuance date *(date)*,** an updated EMP, stamped by a professional engineer licensed in the State of Nevada, shall be submitted to the Division for approval. **The Permittee shall not use reclaimed water after the 45-day due date without having submitted a redrafted EMP per NAC 445A.275, unless granted otherwise by the Division.**
  - The EMP shall contain the information required to comply with this permit. Preparation of the EMP in accordance with *WTS-1 – Guidance Document for Effluent Management Plans for Reuse of Wastewater Effluent* is recommended.
  - The EMP shall include operation and maintenance procedures for the use and operation of the irrigation systems, including storage ponds.
  - Copies of documentation used for purposes of hazard notification to grounds keepers, contractors, or exposed personnel shall be included in the EMP.
  - The EMP shall include a description of sampling and analysis procedures for monitoring requirements specified as a condition of this permit.

PROPOSED DETERMINATION:

The Division has made the tentative determination to issue (renew) the proposed permit, under the provisions prescribed, for a 5-year period. Under NAC 445A.232, this permit is classified as a *Discharge of Treated Effluent for Irrigation - 1,000,000 gallons or more but less than 10,000,000 gallons daily.*

PROCEDURES FOR PUBLIC COMMENT:

Notice of the Division's intent to issue a permit authorizing the facility to discharge to groundwater of the State of Nevada, subject to the conditions contained within the permit, is being sent to the **Nevada Appeal** for publication. Notice is also mailed to the **Carson City Water Department** and interested persons on our mailing list. Anyone wishing to comment on the proposed permit can do so in writing for a period of 30 days following the date of the public notice, and must be postmarked, faxed, or e-mailed by 5:00 p.m. on **September 13, 2004**. The comment period can be extended at the discretion of the Administrator. A public hearing on the proposed determination can be requested by the Applicant; any affected State; any affected interstate agency; the Regional Administrator; or any interested agency, person, or group of persons. The request must be filed within the comment period and must indicate the interest of the person filing the request and the reason(s) why a hearing is warranted. Public hearings granted by the Division are conducted in accordance with NAC 445A.238. The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to NRS 445A.605.

Prepared by: Tamara J. Pelham
August 10, 2004
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